

AIR QUALITY STUDY

MISSION BOULEVARD WIDENING

P M_{2.5} AND P M₁₀ ANALYSES

08-SBD-0-ONT

EA No. 08-924850

Submitted to:

State of California
Department of Transportation, District 8
464 West 4th Street
San Bernardino, California 92401-1400

May 2007

TABLE OF CONTENTS

| | |
|--|----|
| INTRODUCTION | 1 |
| PM _{2.5} AND PM ₁₀ HOT-SPOT METHODOLOGY..... | 1 |
| PM _{2.5} AND PM ₁₀ HOT-SPOT ANALYSIS | 2 |
| CONCLUSION..... | 9 |
| REFERENCES | 10 |

FIGURES AND TABLES

FIGURES

| | |
|--|---|
| Figure 1: Regional Location and Project Vicinity | 4 |
| Figure 2: Aerial Project Vicinity..... | 5 |

TABLES

| | |
|--|---|
| Table A: Ambient PM _{2.5} Monitoring Data (µg/m ³)..... | 7 |
| Table B: Ambient PM ₁₀ Monitoring Data (µg/m ³) | 8 |
| Table C: Existing (2006) Traffic Volumes | 8 |
| Table D: 2030 Average Daily Traffic Volumes (Truck Volumes) | 9 |
| Table E: 2030 Without Project and 2030 With Project Intersection Levels of Service | 9 |

INTRODUCTION

LSA Associates, Inc. (LSA) prepared this Air Quality Technical Addendum for the Mission Boulevard Widening project in response to the United States Environmental Protection Agency (EPA) releasing new PM_{2.5}¹ and PM₁₀² hot-spot analysis requirements in its March 10, 2006, final transportation conformity rule (71 FR 12468) (Final Rule). The 2006 Final Rule supersedes the Federal Highway Administration's (FHWA) September 12, 2001, "Guidance for Qualitative Project-Level Hotspot Analysis in PM₁₀ Nonattainment and Maintenance Areas." This technical addendum was conducted following the procedures and methodology provided in the "Transportation Conformity Guidance for Qualitative Hot-Spot Analyses in PM_{2.5} and PM₁₀ Nonattainment and Maintenance Areas" (EPA/FHWA Guidance) (EPA, 2006a) developed by the EPA and the FHWA.

This PM_{2.5} and PM₁₀ analysis addresses the widening of Mission Boulevard, including the following components identified in the Regional Transportation Plan (RTP) and the Regional Transportation Improvement Program (RTIP): Project ID: SBD031315; Model No. 4159; Description: Mission Boulevard Grove to Haven, widen from four lanes to six lanes, landscaped median and storm drain (3.3 mi), (T21-#60) seg. 1 Archibald to Haven and seg. 2 – Grove to Archibald.

PM_{2.5} AND PM₁₀ HOT-SPOT METHODOLOGY

The new Final Rule establishes the transportation conformity criteria and procedures for determining which transportation projects must be analyzed for local air quality impacts in PM_{2.5} and PM₁₀ nonattainment and maintenance areas. The proposed project is in the South Coast Air Basin (Basin), which has been designated as a federal nonattainment area for PM_{2.5} and PM₁₀; therefore, a hot-spot analysis is required.

A hot-spot analysis is defined in the Code of Federal Regulations (CFR) (40 CFR 93.101) as an estimation of likely future localized pollutant concentrations and a comparison of those concentrations to the relevant air quality standards. A hot-spot analysis assesses the air quality impacts on a scale smaller than an entire nonattainment or maintenance area, such as for congested roadway intersections and highways or transit terminals. Such an analysis is a means of demonstrating that a transportation project meets Clean Air Act (CAA) conformity requirements to support State and local air quality goals with respect to potential localized air quality impacts. When a hot-spot analysis is required, it is included within the project-level conformity determination that is made by the FHWA or the Federal Transit Administration (FTA).

Section 176(c)(1)(B) of the CAA is the statutory criterion that must be met by all projects in nonattainment and maintenance areas that are subject to transportation conformity. Section 176(c)(1)(B) states that federally supported transportation projects must not "cause or contribute to any new violation of any standard in any area; increase the frequency or severity of any existing violation of any standard in any area; or delay timely attainment of any standard or any required interim emission reductions or other milestones in any area."

¹ Particulate matter less than 2.5 microns in diameter.

² Particulate matter less than 10 microns in diameter.

Ambient Air Quality Standards

PM_{2.5} nonattainment and maintenance areas are required to attain and maintain two ambient air quality standards (AAQS):

- **24-hour Standard:** 35 micrograms per cubic meter ($\mu\text{g}/\text{m}^3$). Based on 2004–2006 monitored data, the EPA tightened the PM_{2.5} 24-hour standard from 65 to 35 $\mu\text{g}/\text{m}^3$, effective December 2006. New area designations will become effective in early 2010 (EPA, 2006b).
- **Annual Standard:** 15.0 $\mu\text{g}/\text{m}^3$

The current 24-hour standard is based on a 3-year average of the 98th percentile of 24-hour PM_{2.5} concentrations. The current annual standard is based on a 3-year average of annual mean PM_{2.5} concentrations. A PM_{2.5} hot-spot analysis must consider both standards unless it is determined for a given area in which meeting the controlling standard would ensure that CAA requirements are met for both standards. The interagency consultation process should be used to discuss how the qualitative PM_{2.5} hot-spot analysis meets statutory and regulatory requirements for both PM_{2.5} standards, depending on the factors that are evaluated for a given project.

PM₁₀ nonattainment and maintenance areas are required to attain the following standard:

- **24-hour Standard:** 150 $\mu\text{g}/\text{m}^3$

The 24-hour PM₁₀ standard is attained when the average number of exceedances in the previous 3 calendar years is less than or equal to 1.0. An exceedance occurs when a 24-hour concentration of 155 $\mu\text{g}/\text{m}^3$ or greater is measured at a site. The annual PM₁₀ standard of 50 $\mu\text{g}/\text{m}^3$ is no longer used for determining the federal attainment status. The interagency consultation process should be used to discuss how the qualitative PM₁₀ hot-spot analysis meets statutory and regulatory requirements for the PM₁₀ standards, depending on the factors that are evaluated for a given project.

To meet statutory requirements, the 2006 Final Rule requires PM_{2.5} and PM₁₀ hot-spot analyses to be performed for Projects of Air Quality Concern (POAQC). The Final Rule states that projects not identified in 40 CFR 93.123(b)(1) as POAQC have met statutory requirements without any further hot-spot analyses (40 CFR 93.116[a]).

PM_{2.5} AND PM₁₀ HOT-SPOT ANALYSIS

Projects of Air Quality Concern

The first step in the hot-spot analysis is to determine whether a project meets the standard for a POAQC. The EPA specified in 40 CFR 93.123(b)(1) of the 2006 Final Rule that POAQC are certain highway and transit projects that involve significant levels of diesel vehicle traffic, or any other project that is identified in the PM_{2.5} and PM₁₀ State Implementation Plan (SIP) as a localized air quality concern. The 2006 Final Rule defines the POAQC that require a PM_{2.5} and PM₁₀ hot-spot analysis in 40 CFR 93.123(b)(1) as:

- i. New or expanded highway projects that have a significant number of or significant increase in diesel vehicles;

- ii. Projects affecting intersections that are at level of service (LOS) D, E, or F with a significant number of diesel vehicles, or those that will change to LOS D, E, or F because of increased traffic volumes from a significant number of diesel vehicles related to the project;
- iii. New bus and rail terminals and transfer points that have a significant number of diesel vehicles congregating at a single location;
- iv. Expanded bus and rail terminals and transfer points that significantly increase the number of diesel vehicles congregating at a single location; or
- v. Projects in or affecting locations, areas, or categories of sites that are identified in the PM_{2.5} and PM₁₀ applicable implementation plan or implementation plan submission, as appropriate, as sites of violation or possible violation.

Proposed Project

The City of Ontario (City) proposes to widen an approximately 2.15-mile segment of Mission Boulevard from four to six lanes (one additional lane in each direction) between Archibald Avenue and Haven Avenue. The proposed Mission Boulevard Widening project would increase traffic capacity and improve safety within the project limits. Figure 1 shows the regional location and project vicinity. Figure 2 shows the project location on an aerial photograph.

No Build Alternative. Under the No Build Alternative, there would be no improvements made to Mission Boulevard as proposed in the Build Alternative. However, all local and regional transportation improvements currently planned, programmed, and/or funded would continue through the appropriate planning processes.

Build Alternative. The following improvements are proposed as part of this project:

- Widen Mission Boulevard from four to six lanes from west of Archibald Avenue to west of Haven Avenue. The project will provide three lanes on Mission Boulevard in each direction within the project limits.
- Signalize the Turner Avenue/Mission Boulevard intersection to provide full access from Mission Boulevard to Turner Avenue, including a westbound left-turn lane.
- Improve the intersection of Archibald Avenue/Mission Boulevard to provide three through lanes in each direction and dual left-turn lanes in the northbound, eastbound, and westbound directions.
- Replace the existing traffic signal equipment at the intersection of Archibald Avenue/Mission Boulevard to meet the demands of the new intersection.
- Provide free right-turn lanes in the northbound and southbound directions from Archibald Avenue to Mission Boulevard.
- Install railroad gate arms and other railroad crossing safety equipment for the Union Pacific Railroad (UPRR) crossing on Archibald Avenue north of Mission Boulevard.
- Remove approximately 100 eucalyptus trees along the northern shoulder of westbound Mission Boulevard from just west of Haven Avenue to just west of Archibald Avenue.
- Raise the profile of Archibald Avenue at Mission Boulevard and north of UPRR to improve line-of-sight distance along Archibald Avenue.

Figure 1: Regional Location and Project Vicinity

Figure 2: Aerial Project Vicinity

- Install a raised median on Mission Boulevard from 770 feet (ft) west of Haven Avenue to Proforma Avenue.
- Install curbs and gutters, raised curb medians, sidewalks, storm drain facilities, landscaping, pavement striping markings, street lighting, and traffic signs.
- Raise the elevation of the Mission Boulevard westbound travel lanes from 1,200 ft west of Haven Avenue to 500 ft west of Archibald Avenue to eliminate water ponding and match the elevation of the eastbound travel lanes.
- Widen the existing Turner Avenue Bridge over the Lower Deer Creek Channel (or append a double box culvert to the existing bridge on the north side) and construct wing walls to join into the existing channel walls.
- Relocate existing utilities as needed.

The project will comply with the Americans with Disabilities Act (ADA) requirements. The majority of the proposed improvements will be within the existing right-of-way; however, some partial acquisitions will be required.

The proposed Build Alternative would meet the criteria in Item i above, as it would significantly increase the volume of heavy trucks along Mission Boulevard. Therefore, this project is considered to be a POAQC, and a qualitative project-level PM_{2.5} and PM₁₀ hot-spot analysis has been conducted to assess whether the project would cause or contribute to any new localized PM_{2.5} or PM₁₀ violations, increase the frequency or severity of any existing violations, or delay timely attainment of the PM_{2.5} and PM₁₀ AAQS.

Types of Emissions Considered

In accordance with the EPA/FHWA Guidance, this hot-spot analysis is based only on directly emitted PM_{2.5} and PM₁₀ emissions. Tailpipe, brake wear, and tire wear PM_{2.5} and PM₁₀ emissions were considered in this hot-spot analysis.

Vehicles cause dust from paved and unpaved roads to be re-entrained, or resuspended, in the atmosphere. According to the 2006 Final Rule, road dust emissions are only to be considered in PM_{2.5} and PM₁₀ hot-spot analyses if the EPA or the State air agency has made a finding that such emissions are a significant contributor to the PM_{2.5} and PM₁₀ air quality problem (40 CFR 93.102(b)(3)). The EPA or the California Air Resources Board (ARB) has not yet made such a finding of significance; therefore, re-entrained PM_{2.5} and PM₁₀ are not considered in this analysis.

Secondary particles formed through PM_{2.5} and PM₁₀ precursor emissions from a transportation project take several hours to form in the atmosphere, giving emissions time to disperse beyond the immediate project area of concern for localized analyses; therefore, they were not considered in this hot-spot analysis. Secondary emissions of PM_{2.5} and PM₁₀ are considered as part of the regional emission analysis prepared for the conforming RTP and Federal Transportation Improvement Program (FTIP).

According to the project schedule, the construction will not last more than 5 years, and construction-related emissions may be considered temporary; therefore, any construction-related PM_{2.5} and PM₁₀ emissions due to this project were not included in this hot-spot analysis. This project will comply with the South Coast Air Quality Management District (SCAQMD) Fugitive Dust Rules for fugitive dust during construction of this project. Excavation, transportation, placement, and handling of

excavated soils will result in no visible dust migration. A water truck or tank will be available within the project limits at all times to suppress and control the migration of fugitive dust from earthwork operations.

Analysis Method

According to hot-spot methodology, estimates of future localized PM_{2.5} pollutant concentrations need to be determined. This analysis makes those estimates by extrapolating present PM_{2.5} pollutant concentrations from air quality data measured at monitoring stations in the vicinity of the proposed project. The data from these stations are combined with projections from the 2003 Air Quality Management Plan (AQMP) prepared by the SCAQMD and examined for trends in order to predict future conditions in the project vicinity. Additionally, the impacts of the project and the likelihood of these impacts interacting with the ambient PM_{2.5} levels to cause hot spots are discussed.

Data Considered

Baseline PM_{2.5} Emissions. The closest air monitoring station to the project site is the Ontario–Francis Street Station. This monitoring station is located approximately 1 mile west of the proposed project within the Ontario Airport area. Therefore, the air quality concentrations monitored at this station are representative of the conditions within the project area.

The monitored PM_{2.5} concentrations at the Ontario–Francis Street Station are shown in Table A. These data show that the federal 24-hour PM_{2.5} AAQS (35 µg/m³) has been exceeded at this station in all of the last 6 years. In addition, the annual average PM_{2.5} AAQS (15 µg/m³) at this station was exceeded in all 6 years; however, the concentration continues to diminish every year.

Table A: Ambient PM_{2.5} Monitoring Data (µg/m³)

| | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 |
|--|------|------|------|------|------|------|
| Ontario–Francis Street Air Quality Monitoring Station | | | | | | |
| 3-year average 98th percentile | 65 | 57 | 67 | 60 | 50 | 42 |
| Exceeds federal 24-hour standard (35 µg/m ³)? | Yes | Yes | Yes | Yes | Yes | Yes |
| National annual average | 26.5 | 25.4 | 23.8 | 20.9 | 18.8 | 15.6 |
| Exceeds federal annual average standard (15 µg/m ³)? | Yes | Yes | Yes | Yes | Yes | Yes |

Source: EPA Web site: <http://www.epa.gov/air/data/monvals.html?st~CA~California>, May 2007.

While the current levels of PM_{2.5} in the project vicinity are generally above the federal 24-hour standard, indications are that levels in the future will decrease. To estimate the future background PM_{2.5} concentrations, an exponential projection was made of the 3-year 98th percentile levels (the 2003 AQMP does not have any projections for PM_{2.5} concentrations). The exponential projection for the Ontario levels indicates that the PM_{2.5} concentration would be at the federal 24-hour PM_{2.5} standard of 35 µg/m³ in approximately 2010. This trend is consistent with the ARB's plan to achieve attainment for PM_{2.5} by 2010. The Initial Attainment SIP submittal to the EPA is anticipated by April 2008.

Baseline PM₁₀ Emissions. The monitored PM₁₀ concentrations at the Ontario–Francis Street Station, shown in Table B, indicate that neither the federal 24-hour PM₁₀ AAQS (150 µg/m³) nor the old federal annual AAQS (50 µg/m³) were exceeded between 2002 and 2006. These measured concentrations were significantly below the annual and 24-hour PM₁₀ standards.

Table B: Ambient PM₁₀ Monitoring Data (µg/m³)

| | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 |
|--|------|------|------|------|------|------|
| Ontario–Francis Street Air Quality Monitoring Station | | | | | | |
| First Highest | 166 | 91 | 149 | 93 | 77 | 78 |
| Second Highest | 120 | 85 | 104 | 87 | 74 | 75 |
| Third Highest | 91 | 74 | 79 | 73 | 71 | 74 |
| Fourth Highest | 86 | 72 | 73 | 68 | 70 | 73 |
| No. of days above national 24-hour standard (150 µg/m ³) | 1 | 0 | 0 | 0 | 0 | 0 |
| National annual average | 52 | 45 | 43 | 45 | 41 | 42 |
| Exceeded national annual average standard (50 µg/m ³)? | Yes | No | No | No | No | No |

Source: ARB Web site: <http://www.arb.ca.gov/adam/welcome.html>, May 2007.

While the current levels of PM₁₀ in the project vicinity are below federal standards, indications are that levels in the future will decrease even further. The draft 2007 AQMP (SCAQMD) reports that since the federal annual PM₁₀ standard has been revoked, the Basin is expected to be declared in attainment for the 24-hour federal PM₁₀ standard since 2000. Tables 2-23 and 2-25 on pages V-2-57 and V-2-58, respectively, in Appendix V of the approved 2003 AQMP show the projected maximum 24-hour average PM₁₀ concentrations for the Fontana area to be 47.2 and 45.0 µg/m³ for 2006 and 2010, respectively. This decrease in emissions in the future is largely due to continued improvements in emissions control technologies. To estimate what the background PM₁₀ concentration will be in 2025, a straight-line projection was made from the 2006 and 2010 values, predicting an ambient concentration of 70.5 and 36.8 µg/m³ by 2025 for the 24-hour and annual standards, respectively.

Transportation and Traffic Conditions

Existing average daily traffic (ADT) volumes, truck percentage, and average daily truck volumes for Mission Boulevard in the project area are shown in Table C. The existing traffic volumes along the local roads include 6.3–8.1 percent diesel trucks. The table indicates that Mission Boulevard currently experiences fewer than 10,000 trucks annual average daily traffic (AADT).

Table C: Existing (2006) Traffic Volumes

| Roadway Link | AADT | % of Trucks | Truck AADT |
|--|--------|-------------|------------|
| Mission Boulevard East of Archibald Avenue | 14,800 | 8.1 | 1,199 |
| Mission Boulevard West of Archibald Avenue | 16,800 | 6.3 | 1,058 |

Source: LSA Associates, Inc., February 2007.

Traffic Changes Due to the Proposed Project

The proposed project is a roadway widening project that increases the capacity of Mission Boulevard. This type of project improves roadway operations by reducing traffic congestion at existing interchanges and improving merge operations. Based on the Traffic Operations Analysis (LSA, February 2007), the proposed project would increase the traffic volumes along Mission Boulevard. However, the traffic volumes along Mission Boulevard would not exceed the 125,000 ADT threshold for a POAQC. In addition, although the percentage of truck traffic would exceed 8 percent, the total truck average daily trips would remain below the 10,000-vehicle threshold for POAQC. The future traffic volumes along Mission Boulevard are shown in Table D.

Table D: 2030 Average Daily Traffic Volumes (Truck Volumes)

| Roadway Link | No Project Traffic Volumes | With Project Traffic Volumes |
|--|----------------------------|------------------------------|
| Mission Boulevard East of Archibald Avenue | 43,000 (7,766) | 51,176 (9,469) |
| Mission Boulevard West of Archibald Avenue | 46,484 (7,893) | 55,767 (9,711) |

Source: LSA Associates, Inc., February 2007.

Table E shows the 2030 LOS at the existing and proposed intersections in the project area for the a.m. and p.m. peak hours. As shown in Table E, the proposed project would improve the LOS and reduce the delay at each of the intersections within the project area.

Table E: 2030 Without Project and 2030 With Project Intersection Levels of Service

| Intersection | | Without Project | | | | With Project | | | |
|--------------|------------------------------|-----------------|----------|--------------|----------|--------------|----------|--------------|----------|
| | | AM Peak Hour | | PM Peak Hour | | AM Peak Hour | | PM Peak Hour | |
| | | Delay (sec) | LOS | Delay (sec) | LOS | Delay (sec) | LOS | Delay (sec) | LOS |
| 1. | Archibald Ave./Mission Blvd. | 369.3 | F | 358.1 | F | 23.6 | C | 37.3 | D |
| 2. | Business Pkwy./Mission Blvd. | 12.5 | B | 39.2 | E | 11.3 | B | 26.8 | D |
| 3. | Turner Ave./Mission Blvd. | 11.8 | B | 500.8 | F | 6.5 | A | 16.5 | B |
| 4. | Sterling Ave./Mission Blvd. | 11.7 | B | 37.6 | E | 10.6 | B | 22.9 | C |
| 5. | Haven Ave./Mission Blvd. | 78.2 | E | 109.8 | F | 73.1 | E | 107.6 | F |

Bold/Italic = Exceeds LOS standard

Delay = Average control delay in seconds (sec).

CONCLUSION

Transportation conformity is required under Section 176(c) of the CAA to ensure that federally supported highway and transit project activities are consistent with the purpose of the SIP. Conformity to the purpose of the SIP means that transportation activities will not cause new air quality violations, worsen existing violations, or delay timely attainment of the relevant AAQS. As required by the 2006 Final Rule, this qualitative PM_{2.5} hot-spot analysis demonstrates that this project

meets the CAA conformity requirements to support State and local air quality goals with respect to potential localized air quality impacts.

It is not expected that changes to $PM_{2.5}$ and PM_{10} emissions levels associated with the proposed project would result in new violations of the federal air quality standards for the following reasons:

- The future truck traffic volumes along Mission Boulevard would not exceed 10,000 ADT.
- The ambient PM_{10} concentrations have not exceeded the 24-hour or annual federal standard within the past 5 years.
- Based on the projected PM_{10} concentrations listed in the 2003 AQMP, the annual and 24-hour PM_{10} concentrations would be 74 percent and 47 percent, respectively, of the federal standards by 2025.
- Based on the local monitoring data, the annual average $PM_{2.5}$ concentrations within the project area would be reduced to below the federal standard by 2010.
- By 2030 the intersections within the proposed project area will be operating during the p.m. peak hour at LOS E through F without improvements. The proposed Build Alternative would improve the LOS to B through F.

For these reasons, future new or worsened $PM_{2.5}$ and PM_{10} violations of any standards are not anticipated; therefore, the project meets the conformity hot-spot requirements in 40 CFR 93-116 and 93-123 for both $PM_{2.5}$ and PM_{10} .

REFERENCES

United States Environmental Protection Agency (EPA). 2006a. "Transportation Conformity Guidance for Qualitative Hot-Spot Analyses in $PM_{2.5}$ and PM_{10} Nonattainment and Maintenance Areas" (EPA 420-B-06-902, March 2006).

EPA. 2006b. Final Revisions to the National Ambient Air Quality Standards for Particulate Pollution (Particulate Matter). EPA Web site: www.epa.gov/oar/particulatepollution/naaqsrev2006.html, accessed on March 19, 2007.